

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the reasons that follow. Claims 1, 4, 5, 7-12, and 14-43 are now pending in this application. Claims 7-12, 14, 16-18, 20-34, 37, 38, and 42 are withdrawn from consideration.

Rejection under 35 U.S.C. § 103

Claims 1, 4, 5, 15, 19, 35, 36, 39-41, and 43 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over CN 1,413,797 to Peng *et al.* (hereafter “Peng”) in view of U.S. Patent No. 5,916,635 Ishii *et al.* (hereafter “Ishii”) and EP 1 287 941 to Englert *et al.* (hereafter “Englert”). This rejection is respectfully traversed.

The Office suggests on page 3 of the Office Action that Peng discloses a method of soldering using an active connection agent prepared from nanometer powder which was mixed with water, organic cellulose, and flux.

However, Peng does not disclose or suggest a brazing flux for the brazing of individual heat exchanger parts that comprises, a flux comprising a base material and nanoparticles, wherein the flux contains nanoparticles in an amount between 0.01% by volume and 10% by volume, and wherein the nanoparticles comprise nanoaggregates dispersed in an organic polymer, as recited in claim 1. Claims 4, 15, 19, 35, 36, 39-41, and 43 depend from claim 1.

In particular, the nanopowder disclosed by Peng is not a flux but a bonding material for the bonding agent of Peng. In other words, the nanopowder of Peng melts and solidifies to form a bond between surfaces and Peng discloses that the bonding material further includes a flux, which is separate from the nanopowder material. Peng does not disclose or suggest that the flux includes the nanopowder material. As a result, Peng does not disclose or suggest a flux comprising a base material and nanoparticles comprising nanoaggregates, as recited in claim 1. Nor does Peng disclose or suggest such flux nanoparticles in an amount between 0.01% by volume and 10% by volume, as recited in claim 1.

Ishii discloses water-based hydrophilic coatings and fin materials for heat exchangers that use such hydrophilic coatings. See Ishii at col. 1, lines 8-12. The Office asserts on pages 3-4 of the Office Action that Ishii discloses that the hydrophilic coatings are produced by mixing colloidal silica, water-soluble polymers, and anionic surfactants over aluminum fins and then drying the mixture. The Office further argues on page 5 of the Office Action that it would have been obvious to use a volume percentage of 0.01 to 10 % for nanoparticles in view of Ishii.

However, Ishii does not remedy the deficiencies of Peng because Ishii also does not disclose or suggest a flux comprising, among other things nanoparticles comprising nanoaggregates, as recited in claim 1. Ishii is silent in regard to these features, including the use of nanoparticles in a flux.

The Office argues on page 11 of the Office Action that although the combination of Peng and Ishii does not disclose or suggest a flux that contains nanoaggregates, as recited in claim 1, one of ordinary skill in the art would have “reasonably expected” that the flux of Peng and Ishii would contain such nanoaggregates. The only argument the Office provides in support of this assertion is that the flux of Peng and Ishii would be substantially similar to the flux of claim 1.

However, this is not the case because Peng and Ishii are silent in regard to a flux comprising, among other things nanoparticles comprising nanoaggregates, as recited in claim 1, and do not support the Office’s assertion. The nanoparticles disclosed by Peng and Ishii are not fluxes but instead bonding material and hydrophilic coating material, respectively. The Office provides no other evidence in the art or technical reasoning to support its argument that nanoaggregates would exist, particularly where the prior art is silent in regard to their existence.

Englert discloses a fluxing agent composition for brazing parts, including aluminum or aluminum alloy parts. See Englert at paragraph 0001. The flux of Englert can include $K_{(1-3)}AlF_{(4-6)}$. See Englert at paragraph 0003. However, Englert does not disclose or suggest a flux comprising a base material and nanoparticles comprising nanoaggregates, wherein such

flux nanoparticles are in an amount between 0.01% by volume and 10% by volume, as recited in claim 1. In fact, Englert is silent in regard to a flux that includes nanoparticles comprising nanoaggregates. Therefore, Englert does not remedy the deficiencies of Peng and Ishii.

In addition, it would not have been obvious to modify the nanopowder of Peng by the teachings of Ishii or Englert because the nanomaterials of each of these references are used for different purposes with different considerations. In particular, the nanopowder of Peng is used as a bonding agent instead of a flux, the nanomaterial of Ishii is used in a hydrophilic coating, and the material of Englert is used as a flux and does not include nanoparticles. Therefore, one skilled in the art, when presented with the nanopowder of Peng, which is used as a bonding material, would not have looked to the teachings of Ishii or Englert for ways to modify the nanopowder of Peng.

For at least the reasons discussed above, the combination of Peng, Ishii, and Englert does not disclose or suggest all of the features of claim 1. Reconsideration and withdrawal of this rejection is respectfully requested.

Claims 27-31

Applicant respectfully submits that claims 27-31 should not have been withdrawn from consideration because the features of claims 27-31 are not limited to any of the species listed in the election of species requirement dated October 23, 2008. The species listed in the election of species requirement are drawn to different materials, such as transition metals, pigments, nanoaggregates, oxides, nitrides, carbides, carbon, coated materials, and grafted materials. The features of claims 27-31 are not drawn to any of these materials or species and should be examined.

With regard to the references relied upon in the rejection discussed above, Peng, Ishii, and Englert do not disclose or suggest the features recited in claims 27-31. In particular, the features of claims 27-31 provide advantages that would not be achieved by a nanopowder provided as a bonding agent, as disclosed by Peng.

Conclusion

Applicant submits that the present application is now in condition for allowance. Favorable reconsideration of the application is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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